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This is therefore

Canella alba quorundam. Clus. Exot. p. 324. I. B. p. 461.

Canella alba Park. p. 1581.

Canella alba ex arbore, Ejusdem ibid.

Cinamomum sive Canella tubis minoribus alba. C. B. p. 409.

It is likewise what *Linschoten* in his Description of *America*, translated into French gives an account of, as I suppose from *Peter Martyr*, under the name of *Arbre ou les Pigeons nichent*; and what *Dr. Trapham* in his Discourse of the State of Health of *Jamaica*, calls *Winter-Bark*, or *West-Indian Cinamon-Tree* p. 38. *Hernandez*, p. 43. and *Ximenes* who publish'd his History at *Mexico* in Spanish, fol. 9. likewise describe this under the name of *Caninga*.

It may be doubted whether this be *Ascopo* of *Hariot*, which he mentions p. 24. of his Latin Edition of his Voyage by *Theodore de Bry*, and by *Hakluyt* in his Collection of Voyages, p. 275. of Vol. III.

Thus far this most excellent Botanist; who was likewise pleased to communicate the elegant Figures of these Plants hereto annexed, by which the Reader may see what may be hoped in Natural History from so Curious a Hand.

An Account of the Circulation of the watry Vapours of the Sea, and of the Cause of Springs, presented to the Royal Society. By E. Halley.

SOME time since, I shewed an Experiment of the Quantity of Water raised in Vapour from the surface of the Sea in a day's time, which was so far approved by some honourable Members of this Society, that I have received their Command to prosecute those Enquiries, and particularly in relation to the Method used by Nature to return the said Vapours again into the Sea, which
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is so juſtly performed that in many hundreds of years we are ſufficiently aſſured that the Sea has not ſenſibly decreas'd by the loſs in Vapour ; nor yet abounded by the immenſe quantity of freſh water it receives continually from the Rivers. To demonſtrate this Equilibre of receipt and Expenſe in the whole Sea is a Task too hard for me to undertake, yet in obedience to thoſe whom I have the honour to ſerve, I ſhall hear offer, what to me has hitherto ſeemed the moſt ſatisfactory Account of this Grand *Phænomenon* : I have formerly attempted to explain the manner of the riſing of Vapour by warmth, by ſhewing that if an Atom of Water were expanded into a Shell or Bubble ſo as to be ten times as big in Diamiter as when it was Water, ſuch an Atom would become ſpecifically lighter than Air, and riſe ſo long as that Flatus or warm Spirit that firſt ſeparated it from the maſs of Water ſhall continue to diſtend it to the ſame degree ; and that warmth declining, and the Air growing cooler and withal ſpecifically lighter, the Vapours conſequently ſhall ſtop at a certain Region of the Air, or elſe deſcend, which may happen upon ſeveral Accounts as I ſhall by and by endeavour to make out. Yet I undertake not that, this is the only principal of the riſe of Vapours, and that there may not be a certain ſort of matter whoſe *conatus* may be contrary to that of Gravity : as is evident in Vegetation wherein the tendency of the ſprouts is directly upwards or againſt the Perpendicular. But whatever is the true cauſe, it is in fact certain, that warmth does ſeparate the particles of Water and emit them with a greater and greater Velocity as the heat is more and more intense, as is evident in the ſteam of a boyling Cauldron, wherein likewiſe the Velocity of the Aſcent of the Vapours does viſibly deſcend till they diſappear, being diſperſed into and aſſimulated with the Ambient Air. Vapours being thus raiſed by warmth, let us for a firſt ſuppoſition put, that the whole ſurface of the Globe were

all Water very deep or rather that the whole Body of the Earth were water, and that the Sun had his Diurnal course about it : I take it, that it would follow that the Air of it self would imbibe a certain quantity of Aqueous Vapours and retain them like Salts dissolved in Water ; that the Sun warming the Air and raising a more plentiful Vapour from the Water in the day time, the Air would sustain a greater proportion of Vapour, as warm Water will hold more dissolved Salts, which upon the absence of the Sun in the Nights would be all again discharged in Dews, Analogous to the precipitation of Salts on the cooling of the Liquors ; nor is it to be believed that in such case there would be any diversity of Weather, other than periodically, every year alike ; the mixture of all Terrestrious, Saline, Heterogeneous Vapours being taken away : which as they are variously compounded and brought by the Winds seem to be the causes of those various Seasons which we now find. In this case the Airy Regions every where at the same height would be equally replenished with the proportion of Water it could contain, regard being only to be had to the different degree of warmth, from the nearness or distance of the Sun ; and an Eternal East Wind would blow all round the Globe, inclining only to the same side of the *East*, as the Latitude doth from the Equator ; as is observed in the Ocean between the Tropicks.

Next, Let us suppose this Ocean interspersed with wide and spacious Tracts of Land, with high ridges of Mountains such as the *Pyrenean*, the *Alps*, the *Apennine*, the *Carpathian* in *Europe* ; *Taurus*, *Caucasus*, *Imaxus* and several others in *Asia* ; *Atlas* and the *Montes Lunæ*, with other unknown Ridges in *Africa*, whence came the *Nile*, the *Nigre*, and the *Zaire*. And in *America* the *Andes*, and the *Apalatean* Mountains : each of which far surpass the usual height to which the Aqueous Vapours of themselves ascend, and on the tops of which the Air is so cold
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and rarified as to retain but a small part of those Vapours that shall be brought thither by the Winds. Those Vapours therefore that are raised copiously in the Sea, and by the Winds are carried over the low Land to those Ridges of Mountains, are there compelled by the stream of the Air to mount up with it to the tops of the Mountains, where the Water presently precipitates, gleeting down by the Crannies of the stone ; and part of the Vapour entering into the Caverns of the Hills, the Water thereof gathers as in an Alembick into the Basons of stone it finds, which being once filled, all the overplus of Water that comes thither runs over by the lowest place, and breaking out by the sides of the Hills, forms single *Springs*. Many of these running down by the Valleys or Gutts between the ridges of the Hills, and coming to unite, form little Rivulets or Brooks : Many of these again meeting in one common Valley and gaining the plain Ground, being grown less rapid become a River : and many of these being united in one common Channel make such streams as the *Rhine*, the *Rhone*, the *Danube*, which latter one would hardly think the collection of Water condensed out of Vapour, unless we consider how vast a Tract of Ground that River drains, and that it is the sum of all those Springs which break out on the South side of the *Carpathian* Mountains, and on the North side of the immense Ridg of the *Alps*, which is one continued Chain of Mountains from *Switzerland* to the *Black Sea*. And it may almost pass for a Rule, that the Magnitude of a River, or the Quantity of Water it Evacuates is proportionable to the length and height of the Ridges from whence its Fountains arise. Now this Theory of *Springs* is not a bare *Hypothesis* but founded on Experience, which it was my luck to gain in my abode at Saint *Helena*, where in the Night time, on the tops of the Hills about 800 yards above the Sea, there was so strange a condensation, or rather precipitation of the Vapours, that it was a great Impediment to my Celestial Observations ;

for in the clear Sky the Dew would fall so fast as to cover, each half quarter of an hour, my Glasses with little drops, so that I was necessitated to wipe them so often, and my Paper on which I wrote my Observations would immediately be so wet with the Dew, that it would not bear Ink : by which it may be supposed how fast the Water gathers in those mighty high Ridges I but now named.

Thus is one part of the Vapours blown upon the Land returned by the Rivers into the Sea, from whence they came ; another part by the cool of the Night falls in Dews, or else in Rains, again into the Sea before it reaches the Land, which is by much the greatest part of the whole Vapour, because of the great extent of the Ocean, which the motion of the Winds does not traverse in a very long space of time. And this is the reason why the Rivers do not return so much into the *Mediterranean* as is extracted in Vapour. A third part falls on the lower Lands, and is the *Pabulum* of Plants, where yet it does not rest, but is again exhaled in Vapour by the Action of the Sun, and is either carried by the Winds to the Sea to fall in Rain or Dew there, or else to the Mountains to be there turned into Springs ; and though this does not immediately come to pass, yet after several vicissitudes of rising in Vapour and falling in Rain or Dews, each Particle of the Water is at length returned to the Sea from whence it came. Add to this that the Rain-waters, after the Earth is fully sated with moisture, does by the Valleys or lower Parts of the Earth find its way into the Rivers, and so is compendiously sent back to the Sea. After this manner is the Circulation performed, and I doubt not but this Hypothesis is more reasonable than that of those who derive all Springs from the Rain-waters, which yet are perpetual and without diminution, even when no Rain falls for a long Space of Time : Or than that that derives them from a Filtration or Percolation of the Sea-waters through certain imaginary Tubes or Passages with-

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in the Earth, wherein they lose their saltness. This besides many others labouring under this principal Absurdity, that the greatest Rivers have their most copious Fountains farthest from the Sea, and whither so great Quantities of fresh Water cannot reasonably be derived any other way than in Vapour. This, if we may allow final Causes, seems to be the design of the Hills; that their Ridges being placed through the midst of the Continents, might serve as it were for Alembicks to distil fresh Water for the use of Man and Beast, and their heights to give a descent to those Streams to run gently, like so many Veins of the *Macrocosm*, to be the more beneficial to the Creation. If the difference between Rain and Dew, and the cause why sometimes 'tis Cloudy, at other times Serene, be enquired, I can offer nothing like a proper solution thereof, only with Submission to propose Conjectures which are the best I can find, *viz.* That the Air being heap'd up by the meeting of two contrary Winds, when the Mercury is high, the Vapours are the better sustained and kept from Coagulating or Condensing into Drops, whereby Clouds are not so easily generated: and in the Night the Vapours fall down single as they arose in imperceptible Atoms of Water. Whereas when the Mercury is low and the Air rarified by the exhaustion thereof, by two contrary Winds blowing from the Place; the Atoms of Air keep the Vapours not so well separated, and they coalesce into visible drops in the Clouds; and from thence are easily drawn into greater drops of Rain. To which 'tis possible and not improbable, that some sort of Saline or Angular Particles of Terrestrial Vapour being immixt with the Aqueous, which I take to be Bubbles, may cut or break their Skins or Coats, and so contribute to their more speedy Condensation into Rain.